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Europe 1992: Washington Ponders Effects on R&D

Washington's science-policy circles remain preoccupied by Japan's skillful orchestration of education, research, and industrial innovation. But increasingly, their attention is turning westward as the European Economic Community moves toward its 1992 goal of open borders and closer economic cohesion among its 12 members.

When Europe gets there—and it now seems clear that it will, despite a few remaining nationalistic reservations—it will comprise an economic bloc of 340 million people, nearly 100 million more than the US and almost three times that of Japan. In combined R&D spending, the 12 nations are at about two-thirds of the US level, but Europe spends relatively little on military R&D while the US puts about 30 percent of its total national R&D funding into that category. Given the existing scientific and technical prowess of the European nations, individually and in a variety of consortia, it's no wonder that science-policy specialists have joined others in Washington in wondering about the implications of 1992.

However, in the sci-tech area, as in several others, this interest in futurology is burdened by the languid startup of the Bush Administration. Ten weeks after Inauguration Day, it remains riddled with senior vacancies and exasperated,

talking hopes rather than reasonable expectations when they say that their little agency can mobilize the big departments of the US government for a deep study of how Europe's designs might affect American interests in the R&D area.

The National Academy of Sciences is planning a workshop or symposium, tentatively scheduled for next December, on the implications of 1992 for industrial technology. It's also looking into a broader study, but there's nothing definite on that.

An excellent base for a study of 1992 and sci-tech is the Congressional Office of Technology Assessment (OTA), which has the resources and influence to do it right, though perhaps not swiftly. A resident scholar there tells SGR that "you can't possibly ignore EC 1992," adding that the subject is woven into many studies at OTA. But there's nothing specifically on how science and technology might be affected by the new Europe. That's to be the subject of hearings scheduled for May 16-17 before the House Science, Space, and Technology Committee, a good forum for thinking aloud about the issues involved and drawing public

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sometimes sullen, holdovers who have been told that Bush doesn't want them for the long term but would greatly appreciate their patience while successors are recruited.

The obvious vantage point for studying 1992's effects on R&D is the White House Office of Science and Technology Policy (OSTP), still temporarily headed by the Reagan appointee, William R. Graham. But with a new Director neither appointed nor even rumored, OSTP has dwindled down to a half-dozen-member skeleton crew, including several military officers on temporary assignment. Its senior staff specialist for international matters, Deborah L. Winces-Smith, has gone off to the Commerce Department, where she's been appointed Assistant Secretary for Technology Policy. And no appointment has yet been made of her boss, the Under Secretary of Commerce for Technology, a post that's been filled on a temporary basis, since the closing days of the Reagan Administration, by Ernest Ambler, former Director of the National Bureau of Standards. He's due to retire on April 1, and he has insisted that he's going.

The National Science Board (NSB), which serves as the board of directors of the National Science Foundation, is gamely stepping into the gap with a task force focused on Europe 1992 and science and technology (P. 5). But NSF Director Erich Bloch and Board Chairman Mary L. Good are

In Brief

A \$120,000 cap on salary shares from NIH grants and other awards by the Public Health Service was included in the final Reagan budget, for fiscal 1990. Endorsed by Bush and now on the Congressional agenda, the proposed cap symbolizes the fiscal preeminence of the biomedical sciences. A cap on NSF, adopted last year, stands at \$95,000. In any case, NIH says a small sampling of its project awards found no salaries as high as \$120,000.

The downward fiscal history of the White House Office of Science and Technology Policy was spelled out in detail when William R. Graham, the lame duck Director, testified on the OSTP budget before a House Appropriations Subcommittee on March 14. In real terms, the OSTP budget has fallen from \$4.7 million in 1978 to \$1.6 million this year. Next year's request is for \$2 million, which can pay for 15 staff members, including secretarial and administrative members, he said. Six detailees from other organizations are also on board, Graham reported.

Graduate science and engineering enrollments in the US increased by one percent in fall 1987, to nearly 450,000, NSF reports. Most of the growth was provided by foreign students, whose ranks increased by 5 percent, while enrollments of Americans remained level. The non-US citizens totaled about 76,000, or 28 percent of all fulltime science and engineering graduate students. Details are in NSF 88-316 (6 pp., no charge), available from: NSF, Division of Science Resources Studies, 1800 G St. NW, Washington, DC 20550; tel. 202/634-4634.

... Congressional Study Scans Impact on Science

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attention to them. But the helter-skelter pace of a Congressional hearing, with members coming and going for floor votes and other distractions, is no substitute for systematic study.

From within the capacious federal policy-research establishment, the best effort on that subject so far is a concise review of likely developments and issues, prepared by the Science Policy Research Division of the Congressional Research Service (CRS), part of the Library of Congress, in a special "CRS Report for Congress." Titled *The Europe*

The Europe 1992 Plan: Science and Technology Issues (23 pp., no charge), a special report (No. 89-178 SPR) for Congress by the Science Policy Research Division of the Congressional Research Service, part of the Library of Congress. Order from: Library of Congress, Congressional Research Service, LM-213, Washington, DC 20540; tel. 202/707-7130.

1992 Plan: Science and Technology Issues, the report was coordinated and partially written by Glenn J. McLoughlin, an analyst in the Division, with contributions from other staff specialists.

The CRS analysis is hedged with realistic expressions of uncertainty, but starting with the assertion that "science and technology will play a crucial part in this new [European] order," it examines several basic areas as they might affect the US:

Cooperation in Basic Research and Science. Old ties and close collaboration characterize relations between American and European researchers, the CRS report notes, adding that it's not likely that 1992 will have any immediate effects here. But it cautions that "to the extent that the 1992 Plan reflects a greater degree of pan-Europeanization it could lead to pressures on each country to look to others in Europe for collaboration in research, at the expense of current or potential collaboration with the United States or other non-EC nations." American firms may respond to the lure of the unified European market by enlarging their research programs there, individually or in collaboration with European partners, CRS states. Noting increased investment abroad by American firms, it adds that "This trend could result in a greater proportion of the R&D of such firms being carried out there." On the other hand, the CRS observes that "every affected nation is becoming increasingly aware of the potential of basic research to contribute relatively directly to economic and national security objectives, and the European powers might decide to limit international participation."

Congress, the CRS suggests, "may wish to explore" the degree of attention that's being devoted to these matters by NSF, the White House Science Office, the State, Defense, and Commerce departments, and other executive branch

agencies. Specifically, says the CRS, it should be determined whether these agencies are "(1) monitoring the implications of the various EC directives—existing and forthcoming—for US scientific and technical relationships, (2) taking those implications into account when formulating international projects, programs, and policies, and (3) ensuring the continued access of US scientists and researchers to European programs on a reciprocal basis with European access to American programs." CRS went on to recommend assignment of a major monitoring role to the office of the Under Secretary for Technology in the Department of Commerce—a post that was established last year in the trade bill. Congress, it said, "may also wish to encourage a visible role for this agency in future discussions with the EC on access to R&D and technology transfer. . ."

Standards. Europe's commitment to harmonizing technical standards in the 12 EC nations could help the sales of American-made products, the CRS states. But it adds that, according to a report last year by the National Bureau of Standards, "interested parties in the United States do not have the opportunity to review and comment on proposed EC standards and directives during the development phase, i.e. before they are published in final form. This prevents the review and full consideration of US inputs at a time when they might be persuasive." The CRS notes that international negotiations on technical standards are primarily the responsibility of the US Trade Representative, rather than any federal research-related agency. Adding that the successor to the National Bureau of Standards, the National Institute of Standards and Technology (NIST), is "an information source" on standards for industry, the CRS suggests that "Congress may wish to monitor these NIST activities as they relate to Europe 1992 and determine whether additional or expanded programs are desired."

Information Technology. The EC has put a high priority on improved technology and a bigger market share in this area, the CRS observes. With Europe's special programs in place and likely to grow, policy issues for the US include:

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... Study Queries US Emphasis on Military R&D

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"Does the US government need to invest additional resources in information technology R&D? Do R&D programs need to be better coordinated within the government, as well as between government, industry, and academia? Should US research efforts be focused on 'strategic' technologies vital to economic competitiveness? Will US research efforts which are primarily defense-oriented be as effective in supporting economic development as EC research efforts that are designed to develop commercial products? If not, should additional resources be committed for civilian R&D initiatives?"

Energy. "A principal policy concern for the US," the CRS states, "is whether the US energy R&D program should be changed or expanded to meet any market challenges that may arise from products emerging from a larger EC R&D program. In particular," the CRS asks, "would an integrated EC develop a nuclear reactor that meets the conditions of inherent safety, standardized design and modularity that are likely to be required for resurgence of the nuclear option in the US?" The CRS also asks whether Europe might choose to go it alone on fusion research. "Such a choice," it states, "would affect the US fusion program, which is becoming increasingly international."

Defense Technology Base. Europe 1992 is a non-military enterprise, the CRS report notes. But it points out that the emphasis on technology unavoidably spills over into military matters because of "the belief among EC policymakers and leaders that civilian research can perform 'double duty' in meeting both civilian and defense needs (versus US policies which separate these two priorities)..." Europe's dual approach raises several issues, the CRS states. "Will US suppliers of defense technology for Europe be affected? How will the elimination of border controls affect the multilateral export-control system? Will US exporters be able to take advantage of an EC-wide export-control zone?"

The CRS report suggests that the coming of Europe 1992 may provide an occasion for Congress to reexamine some major elements of American R&D policy, including: "R&D funding priorities, particularly the balance between civilian and defense R&D funding; whether multi-year funding cycles [which are common in Europe] should be considered for US R&D projects; whether export controls of scientific information and technology need to be reevaluated; and whether other means of restricting US technology transfer, such as trade policy, will have an impact on how our European allies structure their defense technology base after 1992."

The CRS report concludes by noting that "One of the primary factors in the ability of foreign firms to compete with US industry is their government's support for technology development activities. In numerous cases," the report states, "governments in these countries actively promote

commercial technology advance and application as a component of economic growth. They foster industry-government cooperation and encourage collaboration between industries, companies and/or technically trained personnel, while allowing competition to stimulate development for the commercial marketplace. This is in contrast to the United States, where technological considerations are not well integrated into economic policy decisions; where responsibility for technology development, if present, is diffused across agencies, and where cooperation generally has been limited to research."

The CRS report is essentially a once-over-lightly speculation on the consequences of an unprecedented and complex event. It is an invitation to serious study for which the time is less than it appears, since the movement toward Europe 1992 is a continuing process that's already well in motion.

The American scientific community and its friends in official Washington ought to be thinking about the new Europe, which, by many measures, will all at once become the world's mightiest base for intellectual endeavors.—DSG

Job Changes & Appointments

Charles E. Hess, Dean of the College of Agricultural and Environmental Sciences, UC Davis, has been nominated to be Assistant Secretary of Agriculture for Science and Education, succeeding **Orville G. Bentley**. Hess was Associate Director of the California Agricultural Extension Station from 1975-87.

Also at Agriculture, **James Cason**, a *bete noire* of environmental purists, has been nominated to be Assistant Secretary for Special Services, which has jurisdiction over the US Forest Service and the Soil Conservation Service. Cason, currently Deputy Assistant Secretary of Interior for land and minerals management, recently opposed an endangered-species designation for the spotted owl. At Agriculture, he would succeed **George S. Dunlop**.

James C. Fletcher, who returned for a second tour as Administrator of NASA after the *Challenger* disaster, has resigned to head the guerilla fusion program at the University of Utah, where researchers claim to have developed a simple, inexpensive fusion technique. Fletcher, a physicist, was President of the university from 1964-71. His successor at NASA has not yet been named.

Managing Editor **Tom Ewing** has been named Editor of *The Scientist*, the biweekly newspaper published by the Institute for Scientific Information. Ewing succeeds **Ellis Rubinstein**, who has been appointed News Editor of *Science*, the weekly magazine of the American Association for the Advancement of Science. Rubinstein takes over from Barbara Culliton, who has been appointed "correspondent-at-large" for *Science*.

NSF Heads Urge Appointment of Science Adviser

The monthly meetings of the National Science Board, policymaking body of the National Science Foundation, are usually followed by an informal question-and-answer session between science writers and NSF Director Erich Bloch and NSB Chairman Mary L. Good, whose fulltime job is President-Engineered Research Materials, Allied-Signal Corp. The subject matter usually reflects policy issues of current concern in Washington science circles. The latest session was held March 17. Following are excerpts, transcribed and edited by SGR.

Q. Complaints are being heard about the long delay in appointing a White House Science Adviser.

Good. It's not so much that it's strange that no one has been picked, but there have been fewer rumors than I can ever remember.

Q. Are the Foundation's operations impeded by the absence of a Science Adviser?

Good. Not at the moment. It's simply that the issues that the Congress is interested in, priorities and things of that sort—which they really are very interested in—would be helped a lot by the presence of a Science Adviser, and indirectly we would be, too.

Q. Can't Dr. [William] Graham [the holdover Science Adviser from the Reagan Administration] fill this role?

Good. He is doing that, and, in fact, he is continuing the programs that he had in place. For example, I got a letter from him this week with respect to the task force on the technology transfer agreement with Japan. But when you want to put strategy in place for this particular Administration, you are in a better position if you're going to be there for the longer haul.

Q. [To Bloch] Do you share the view that the absence of a Presidential Science Adviser hasn't really made much of a difference for the Foundation?

Good. That's not what I said, quite.

Bloch. I think it's very important that position is filled by a person that understands the issues of the day and is active in trying to resolve these issues at that level, working with individual agencies. I think that is very important. Can you survive without it? Sure you can. But that doesn't make it right.

Q. Do you know if the White House is actively looking?

Bloch. I don't know.

Q. Have they sought your advice lately?

Bloch. [Jokingly] Have they sought my advice lately? Ever!

Q. At NSF's hearing with the House Appropriations Subcommittee, the members worried aloud about where the money is to come from for all the items in their jurisdiction [which includes NSF, NASA, Veterans Administration, and the Department of Housing and Urban Development]. Did you sense that they are sympathetic to the role of NSF?

Bloch. I think they have great sympathy for the role of the

Foundation. But they are in a squeeze. The numbers speak for themselves. Counting up the requests, it means a \$7-billion increase in their budget allocation. And even if you just look at NASA and NSF together, it's about \$2.5 billion out of those seven. We are 10 percent of that \$2.5 billion. We're kind of a small part of it. Nevertheless, it adds up and that is their predicament.

Q. When [Presidential Science Adviser] Graham testified on the day before NSF was there, the members repeatedly asked him for an order of priorities on the science items. He insisted that the budget reflects a set of priorities, that it doesn't have to be rearranged because it's all doable.

Bloch. It's Congress that has to wrestle with that and make a final judgment on that. Our budget reflects our priority and the President mentioned the doubling of the Foundation's budget a couple of times in the last few weeks. That represents his priority. So, I think, from that viewpoint we are well supported. Now Congress has to make up its mind on priorities.

Q. There seems to be a lot of interest in the House in spending more money on science education than you requested in the budget. Can you usefully spend it?

Bloch. We discussed that with the [House Subcommittee on Science, Research, and Technology] and I mentioned to the Chairman [Doug Walgren, D-Pa.] that we have to be extremely careful that we don't throw money at the problem without knowing that it's being spent properly and without a foundation for spending it. I'm never for big increases on a year-to-year basis. That's why we're talking about a five-year doubling of the Foundation's budget instead of a 12-month doubling.

Good. If you look at what we've actually requested for education, it's a significant increase over last year. [The NSF direct education budget is \$171 million for FY 1989, with \$190 proposed for FY 1990. Over the same period, the overall NSF budget would rise from \$1.9 billion to \$2.1 billion.] It's a much bigger increase than the rest of the Foundation has requested. I think that's appropriate. But we have to be careful. You need time to design the program appropriately, because that's a program that's somewhat different from the research programs. I could double the budget in chemistry, for example, tomorrow, and I could adequately spend it without any qualms. Because I'm funding only probably a third of the really quality proposals. Education is somewhat different, because whatever the amount of money in our budget, it can only be a catalytic amount compared to what is spent in the country on education. It's a different kind of an activity. And you've got to manage it and plan it, and to do that adequately requires some time. Sure, we could probably use some more money than we've got in the budget. Nobody is arguing that. The other issue is stability. The issue in the education budget is not only a reasonable increase, so that we can continue to do

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... Industry Urged to Send Researchers to Japan

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things that make sense, but, secondly, stability. One of the problems in the past was that the NSF education budget went up and down, programmatically and dollarwise.

Bloch. At the [NSF] authorization hearings [in the House] yesterday, [Rep. George] Brown (D-Calif.) asked why is it that these programs in the '60s in pre-college education didn't result in a permanent change in the education area. As soon as they stopped, we went right back to whatever we did before. I think one of the reasons is that these programs were not cemented into the structure of the country. It's not good enough for the federal government to throw money into these programs. The states and the localities have to pick them up. Industry has to pick them up. The programs that we are starting now have more of that kind of a connection than the previous programs. And that again says don't go too quickly and make sure that other people contribute, not just in terms of dollars but in terms of the effort.

Q. Doesn't that speak against some of the programs the President is proposing, for example, the magnet schools and for each member of Congress to select an outstanding science student?

Bloch. No. On the magnet schools, it depends how that's being implemented. I'm sure the federal funding of magnet schools is not sufficient to fund magnet schools [to a significant extent]. Again it comes back to what the community does in addition or in response to the federal program. These teacher programs per district, or undergraduate fellowship programs per district. These are symbolic programs. In the end, they don't make that much of a difference. It's 500 more or less people. But it's highly symbolic that Congress thinks this is important and, hopefully, that brings other people into the act, and other foundations and individuals that would not be involved otherwise.

Good. I think it also sends a signal to the public. We do need these kinds of visibility, what I might call inspirational, kinds of things. And it's a vehicle to do that.

Q. Reciprocity in our scientific and technical dealings with Japan is an increasingly sensitive political issue. How has that affected NSF?

Bloch. We have been focusing on that in some of the programs we jointly run. But more important, in getting some more of our own researchers into Japanese laboratories—government, industry, and universities. We have a major push on that. We have about 47 people identified that are going over there this year for extended stays—like an academic year.

Q. These are the fellowships the Japanese have provided for foreigners?

Bloch. Yes. They all relate to that and are funded by that essentially. And that's in addition to our own programs.

NSF Deputy Director John H. Moore. Under the Japanese program, there are 55 fellowships that NSF either recommends or coordinates. But there are in addition about 35

or 40 that the Japanese government itself will select. So, they're providing nearly 100. We're close to our quota, but I really don't know if they're close to theirs.

Bloch. We want to attract people from industry, from government laboratories and from academia. The 47 all pretty much came from government or from academic institutions. And nobody from the private sector. And I think it's very important that the private sector take advantage of this opportunity. They can be selective. It's clear that a company that's in competition with a Japanese company doesn't necessarily want its researchers to go to that company. But that's not an issue. They can go to a government laboratory that works in similar basic-research areas or to a university.

Q. Do you see 1992 in Europe as having any important policy bearing on science in the US?

Bloch. Yes, in fact, the Board is starting a task force on 1992 to find out what the ramifications are on our relationships with the individual countries and with Europe as a whole. We've got to assume there will be major changes.

Q. Don't they tend to exclude us in some areas, like Project Eureka [a European cooperative program in industrial technology]?

Bloch. I don't know. That's exactly one of the issues.

Good. It really isn't clear where they're excluding us or where we're not applying or we're not making an effort to get involved. There are a number of the European programs that are now in place. We'll focus on those issues that are most pertinent to the NSF. On the other hand, surely there will be some impact on the industrial sector that will impact us. For example, if it becomes absolutely imperative for American companies to have a research establishment in Europe if they wish to be globally competitive and market in Europe, that would have an impact on us.

Q. Many American companies are establishing research facilities in Europe.

Good. Very true. And that has an impact on our programs, because who's going to staff those and what does that do to the infrastructure here?

Bloch. There's a companion study going on industrial R&D in the US by a different task force of the Board. On 1992, we have been so used to dealing with individual countries, which will continue, but in addition we are dealing now with the superstructure, and that's a lot more difficult. That alone deserves a good look.

Q. Off in the future, do you anticipate a European-wide counterpart of NSF?

Bloch. There is one, [the European Science Foundation], but it is very small. But that might take on a completely different role than it's had over the past 10 or 15 years.

Q. Is OSTP (the White House Office of Science and Technology Policy) in the picture? That's the level at which these things are usually done.

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Notes from the Senate: Science Issues on Griddle

The chief Washington lobbyist for the big research universities, Robert M. Rosenzweig, recommended that federal research centers be scrutinized for axing, *a la* the independent commission that recently picked military bases for closure.

Senator Pete V. Domenici, Republican of New Mexico, home of the Los Alamos National Lab and other major federal research facilities, responded that he'd go along with the suggestion if a process of termination reviews were extended to universities.

And thus they were off and expostulating, March 9 at the Senate Budget Committee, in one of the most far-reaching and candid hearings on science policy in a Congressional season unusually crammed with attention to that subject. Titled "Science, Technology, and Strategic Economic Policy," the Budget Committee hearing ranged over many issues. But the Senators and the witnesses repeatedly returned to the one item that is exasperating the capital's science-policy crowd as nothing else has in recent years: The White House's seeming inattention to science policy, as manifested in the failure so far to appoint a Presidential Science Adviser.

Rosenzweig, President of the Association of American Universities, comprising 56 institutions irremovably lodged in the federal R&D trough, professed reverence for "quality" as the criterion for support. And he even chided unnamed institutions for unrealistically high, and costly, aspirations of greatness in research, sometimes to the detriment, he said, of undergraduate programs.

Proceeding on this theme, he ruefully noted there are many in government and academe who believe that "the

primary role of the federal government is to spread the available funds to all institutions and laboratories in which research is conducted or planned." He added that "some national laboratories have come to occupy the same status as military bases, justified not for what they do to advance a mission, but for what they contribute to the local economy."

Warning that the nation must seek the best value from research spending, Rosenzweig said, "We seem to have found a way to evaluate the usefulness of military bases to the defense mission and to close some down where that is indicated. A similar system is required for national labs. Many of them are doing first-class work, but others are not."

Domenici, from a state where undiluted support of the national labs is a necessity for survival in politics, fulfilled the requirement: "It seems to me that if you approach it that way, you ought to recommend that you set up a commission to decide which universities are doing duplicative work. There are many. You would admit that. . . Yet we have assumed in our country we can afford it all, because, as you indicated, we certainly did well with that for the first 40, 50 years of this American industrial prosperity."

The next witness was a leading Japan basher on the Washington circuit, Clyde V. Prestowitz, a former government trade official, and author of the book *Trading Places: How We Allowed Japan to Take the Lead*. He stressed a line often heard on Capitol Hill, that the US spends too much on military research and that there's little or no validity in the old claims that we get it back in civilian spinoff. Military technology actually lags behind the civilian sector, Prestowitz said, adding that the government's research enterprise is an uncoordinated "hodgepodge." He tossed in that "The President's Science Adviser has virtually no influence in the White House or in the US government."

Chairman Jim Sasser (D-Tenn.) responded: "There is no Science Adviser there, Mr. Prestowitz."

"Well," Prestowitz replied, "the office of the President's Science Adviser. . . It has no influence precisely because it is an adviser. Unless you have people who are in the line bearing responsibility, they are not going to have a lot of influence." The solution, he continued, is to bring a flock of federal research agencies together in a Department of Science.

Senator Ernest F. Hollings (D-SC) recalled the struggle to enlarge the industrial role of the National Bureau of Standards into what became the National Institute of Standards and Technology. "It is insufficient" for the competitive situation of the country, Hollings said. "It needs a Department of Science and Technology. Heavens above, you and I will be dead and gone. There is no chance. I mean we might as well testify to. . . realities and possibilities. Government is the art of the possible. So if we got that one [proposed], we would really debate it, and nothing would ever happen." Hollings then went on to express concern about the coordination of the many federal agencies en-

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Bloch and Good

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Bloch. No, these are task forces of the National Science Board, and we're going to deal with it that way.

Q. But can you draw in, for example, the Office of Energy Research at the Department of Energy, NIH, Commerce, and Defense?

Good. Sure we can, and will in those cases.

Q. You can invite them, but they don't have to show up.

Bloch. If you boil the ocean, you're not going to get anywhere. You've got to start somewhere.

Good. First of all, you have no chance at all unless the agency that you represent has an opportunity to have a position. If you can do that, then maybe you can go further.

Q. Have the task force on Europe 1992 and the others been established in consultation with OSTP?

Bloch and Good. No.

Good. No reason to. In our opinion, those are three issues which are going to impact significantly on the National Science Foundation, and we feel absolutely obligated to try to understand them, and we'll try to understand them in as global a context as we can.

... Science in Good Shape, NAS Head Testifies

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gaged in research on global change.

Another witness, Frank Press, President of the National Academy of Sciences, responded: "If the President follows through and heightens the level of authority and responsibility of his Science Adviser, I think it will be a different situation."

"Oh, that is true, it is up to the particular President," Hollings replied. "And if you get in a science President," he continued, "you will have what you want. Or maybe not. They say this fellow Sununu [John Sununu, White House Chief of Staff, a PhD in engineering] is a scientist. No one else wants to work with him."

Prestowitz broke in with "Nobody here is really that concerned that we are losing our lead in science and technology. . . . We have hearings coming out of our ears. Everybody comes to the hearings. They go to sleep."

"That is a very dramatic and emotional statement," said Academy President Press, "but I disagree with some of the things that were just said"—an unusual admission for Press, who tends to the mild in his public appearances. Defending American science as the world's leader, he declared, "Our system has delivered. The problems we face are not those of science and technology, our national laboratories, our research universities." American industrial competitiveness, he said, suffers from high capital costs, "the litigious nature of our relationships, the short-term view of American management," and so forth. "I do not think we need to create a new institution to do science well in the United States. We do it very well at the present time."

The hearing turned to priorities, and Rosenzweig expressed an offbeat view for the Washington representative of financially ravenous big academe: The major threat to American science comes from the inadequacies of "elementary and secondary education, generally, and in the sciences, specifically. If I had only one more dollar to spend on improvement of science, that is where I would spend it," Rosenzweig said with a confidence that was perhaps rooted in the unreality of his scenario.

Continuing, he said that "the major priority issue at the moment," is that federal R&D spending has "shifted dramatically toward the military side in the last decade, and to

the detriment of the civilian sector, and that needs to be changed."

The bandwagon of dismay with the military grip on R&D rolled on, with Senator Timothy E. Wirth (D-Colo.) stating: "I do not see the need any more for us to have this enormous emphasis on military research to the cost of civilian research, and I honestly do not see a commitment to the kind of research and global environmental issues that reflects the urgency of that demand."

Referring to himself, Rosenzweig, and Prestowitz, Press said, "If there is any theme to the testimony of all three of us this morning, it is that there may be a new definition of international security: The economic status of the United States, and the new global security problems of the global climatic change, the ecological situation in the world. . . ."

As the allotted time for the three witnesses drew to a close, Senator Domenici said that he had over-reacted to Rosenzweig's comments about superfluous national labs. Praising Rosenzweig as "rather balanced in that you were also critical of excessive expenditures in the university system," the Senator said, "My final conclusion is that we do not have an appropriate apparatus to help us, and your recommendation that we ought to focus on a Science Adviser just cries out for solution."

The final witness, Alvin Trivelpiece, Director of the Oak Ridge (Tenn.) National Laboratory, was on friendly ground, with Chairman Sasser of Tennessee expressing pride in the laboratory. "Are our national labs being under-utilized?" Sasser asked.

"Yes," replied Trivelpiece, and he was off on a recitation of the unique capabilities of the national labs and how it would be wise to assign them greater responsibilities. From global change to research for industrial competitiveness, he said, the national labs are a unique and powerful resource. The Senators nodded in agreement.—DSG

In Print

(Continued from Page 8)

Cooperation and Development (OECD), policy-research consortium of 24 industrialized nations, describes efforts in various countries to get those big, expensive national labs to contribute to economic goals.

OECD publications are available from booksellers and OECD offices in major cities throughout the world. In the US, order from: OECD Publications and Information Center, 2001 L St. NW, Suite 700, Washington, DC 20036-4095; tel. 202/785-6323.

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From the Congressional Office of Technology Assessment:

Higher Education for Science and Engineering (GPO Stock No. 052-003-01148-4, 268 pp., \$12), says federal policy should focus on minority-group members and women to counter the impending demographic decline in graduate science and engineering enrollments. Recommended are more federal aid for students, work-study programs in federal labs, and emulation of successful methods for increasing minority recruitment. Specifically cited was California's Minority Engineering Program, "which has tripled participant's likelihood of persisting to a degree in engineering," OTA noted.

Patenting Life (GPO Stock No. 052-003-01137-9, \$8.50, 195 pp.), fifth in the OTA series on New Developments in Biotechnology, examines the legal, economic, and ethical implications of patents on animals, the first of which was awarded in 1988 for the so-called Harvard mouse, amid expressions of concern and dismay from many quarters. OTA says 44 animal patent applications are pending in the US, and at least nine in Europe. Included in the report are suggested options for Congressional action, including doing nothing, amending patent and plant legislation to accommodate the peculiarities of animal patents, and declaring a moratorium on such patents to allow further public discussion and gathering of data.

Order from: Superintendent of Documents, USGPO, Washington, DC 20402-9325; tel. 202/783-3238.

The previous publications in the OTA biotechnology series are: *Ownership of Human Tissues and Cells* (NTIS #PB 87-207 536AS); *Public Perceptions of Biotechnology* (PB 87-207 544AS); *Field-Testing Engineered Organisms: Genetic and Ecological Issues* (PB 88-214 101AS); *US Investment in Biotechnology* (PB 88-246 939AS). A related OTA publication is: *Mapping Our Genes—The Genome Project: How Big, How Fast?* (PB 88-212 402AS). These five are available from the US National Technical Information Service, 5285 Port Royal Rd., Springfield, Va. 22161-0001; tel. 703/487-4650.)

Health Risks and the Press (111 pp., \$13.95), produced by the American Medical Association and the Media Institute (a Washington-based research organization), edited by Mike Moore, editor of *The Quill*, contains essays by Bruce Ames, UC Berkeley; Victor Cohn, *Washington Post*; Dorothy Nelkin, Cornell University; Kenneth E. Warner, University of Michigan, and Ronald Kotulak, *Chicago Tribune*, on the highs and lows of journalistic treatment of scientific and medical topics.

Order from: Media Institute, Publications Department, 3017 M St. NW, Washington, DC 20007; tel. 202/298-7512.

Our Changing Planet: A US Strategy for Global Change Research (38 pp., no charge), report from the White House Office of Science and Technology Policy, prepared by its Committee on Earth Sciences, chaired by Dallas L. Peck, Director, US Geological Survey, as the inter-agency master-plan for research in this area. Issued to accompany the final Reagan budget, and accepted by Bush, the report calls for raising spending in this area from \$133 million this fiscal year to \$190 million in FY 1990, which begins October 1. The report is notable for brevity, clarity, and rarity as one of the few public documents issued in recent years by OSTP.

Order from: Office of Science and Technology Policy, New Executive Office Building, Room 5013, 725 17th St. NW, Washington, DC 20506; tel. 202/395-7347.

Information on Selected Climate and Climate-Change Issues (Open-File Report 88-718; 26 pp., \$4.50), report by the US Geological Survey, inspired by the public's horrified discovery last year of the Greenhouse Effect and the ensuing clamor over who's grandstanding and who's talking real science. Here the USGS states in lay terms the generally accepted knowns and unknowns.

Order from: USGS, Books and Open-File Reports Section, Box 25425, Federal Center, Bldg. 810, Denver, Colo. 80225; tel. 303/236-7476.

The Changing Role of Government Research Laboratories (74 pp., \$15), from the Organization for Economic

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